BELLCOMM, INC.

SUBJECT: KSC/CIF ADP Planning for SC Operations Documentation - Case 330

DATE: January 9, 1967

FROM: V. Muller

ABSTRACT

Scheduling requirements necessitate adjustment of the KSC/CIF equipment particularly in the area of ADP support for preparing SC operational procedures and test documentation. Various solutions are being proposed by KSC/CIF, KSC/SCO and NAA.

This memorandum highlights some of the problem areas and outlines the various proposals. A summary statement is included to qualify the proposal which appears most feasible.

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MEMORANDUM FOR FILE

General

Review of the CIF ADP capability with regard to ADP 4F schedule support requirements has resulted in various proposals for adjustment of existing CIF hardware. In particular, the area of ADP support for preparing SC operational procedures and test documentation is of immediate concern. The increased number and new configurations of forthcoming SC impose a workload in excess of present capabilities.

This memorandum highlights some of the problem areas and outlines the various proposals.

A more comprehensive paper describing the complete CIF task (on-line and off-line) is in preparation.

Background

The overall CIF support functions can be classified into operational support functions and administrative support functions. At the present time, the operational support functions comprise some 70% of the total CIF ADP workload.

Within this operational support function, the workload can be grouped into on-line operational support, such as data processing during test operations, and the off-line operational support, such as data reduction and operations documentation preparation.

Operations documentation preparation is a different form of data handling than any other form of CIF on/or off-line data processing. It is a formatting and sorting job, characterized by numerous iterations in the documentation generation process, to accommodate the changes of hardware and procedures as they arise from engineering orders and from the outcome of the daily checkout operations. This operations documentation preparation, as the subject of this paper,

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includes such items as the Operation Checkout Procedures (OCP's), Program Requirement Process Specifications (PRPS's), Support Requirement Package (SRP), listings of GSE and ACE-SC Interface (GID, AID) requirements and others.

OCP's define the step-by-step procedures for verification of the ground support equipment and the flight hardware. PRPS's contain the specific measurement and test requirements and constitute the basis for the ACE-SC test tape preparation. SRP is a separate form of PRPS type information, generated locally at KSC, in contrast to the OCP's and PRPS's which are generated at the contractor's site but are used at KSC. GID and AID documentation informs on patch and wiring requirements and provides additional inputs to the PRPS's and ACE-SC test tapes.

Although the contractor provides the initial OCP and PRPS packages, successive changes, modifications, updating and LV/SC integration requirements impose a daily workload of some 25,000-35,000 key punched cards in the case of SC OCP preparation alone.

Present Documentation Preparation Implementation

The SC operational documentation preparation is separated into two specific areas, OCP preparation and PRPS (including SRP, GID, AID, etc.) preparation.

The OCP in its final form is an English language textbook, written for each major test and for each individual system, systems configuration or integrated vehicle. Examples of an OCP are OCP-K-9935 defining Electrical Power Systems Functional Checkout and OCP-K-007 defining launch countdown. The final version depends on the final hardware configuration, test requirements and test procedures.

The modification and finalizing process evolves from the initial OCP listings, furnished by the contractor, and continues through the key punch/card operation to the printouts with the change incorporated; subsequent manual comparison of the printout with the master listing and the change request completes one cycle. One major difficulty exists in the fact that a singular change can affect several OCP's and all the card batches in question have to be sorted out and replaced. Requirements for February 1967 anticipate 13,176 man hours of key punch effort for OCP preparation.

PRPS's (et. al.) exist in the form of data listings; their preparation consists mainly in identifying and sorting of vast amounts of data. At present, two IBM 7010 computers

and one GE 415 and GE 235 computer are utilized for compilation of these listings. The 7010's are an upgraded version of the IBM 1410 computers formerly used by SCO for PRPS generation; the GE 415 and 235 computers had been retained by CIF from their former Hangar R operations under the LOC charter. The computers are leased. Plans had been made to replace the above computers gradually and shift operation to the GE 635 system as it would become operational.

Problem Areas

Present facilities and procedures to generate the OCP's become inadequate to support requirements by June 1967. PRPS preparation by means of the GE 635 system will not be possible during 1967 because of 635 systems unavailability during this time.

The leases of the IBM 7010, GE 415 and 235 computers used for PRPS preparation, terminate within this fiscal year. Also, it is felt that, in the case of 635 systems availability, on-line support requirements will load the system to capacity and PRPS type data handling is too simpleminded an operation to tie up a sophisticated processing system.

Proposed Solutions

The KSC/CIF proposal for OCP preparation includes addition of an IBM 1440/1460 ATS (Administrative Terminal System) to allow for remote access to a special purpose processor in the CIF from the users (contractor and NASA personnel) test areas via typewriter. Operational advantages are listed, such as on-site access to preliminary OCP's, fast playback to the test engineers informing on the changes made, and improved data manipulation capability. In addition to anticipated time savings, cost savings of 56% are indicated compared to the present system and a February 1967 workload.

The KSC/CIF proposal for PRPS's preparation consists in extension of the leases for the IBM 7010 and GE 415 computers until 1969.

The KSC/SCO proposal for OCP preparation supports the CIF ATS solution. In fact, the original ATS request had come from SCO and extensive trial runs had been performed successfully by SCO on an IBM demonstration ATS between Cocoa Beach and New York.

The KSC/SCO proposal for PRPS preparation diverges from the CIF solution in as much as the PRPS type data handling be reassigned to the contractor site (Downey, Bethpage) and only preparation of the SRF type documentation be retained at KSC. This rearrangement is believed to reduce the PRPS type data load at KSC by some 80%. The remaining task is believed small enough to be handled by the ATS as proposed.

NAA reflects the actual documentation originator's and user's point of view and joins CIF and SCO in the ATS proposal for OCP preparation. Likewise, the PRPS solution as proposed by SCO is favored; however, it is felt that additional computing capability should be retained for tasks which had not necessarily been performed until now because of lack of data processing equipment and which appear necessary for an adequate documentation job. Such tasks include comparison of ATS listings with master files and evaluation of the OCP entries with regard to systems interface effects.

Conclusion

The ATS proposal for OCP preparation appears to be a feasible solution and is favored by all using agencies. It represents a cost savings; the time savings will be further evaluated by means of a trial setup.

Retention of the IBM 7010 and GE 415 computers appears preferable until at least the ATS is working as anticipated, and better definition of support requirements have been made available.

From the recent correspondence between MSF and KSC with regard to IBM 7010 and GE 415 computer lease extension, it could be understood that requirements for OCP preparation had been mistaken for requirements for PRPS preparation. If the IBM 7010 and GE 415 computers should be retained on the basis of OCP requirements, it would make a later ATS justification much more difficult, and between the two, the procurement of the ATS seems to be more critical.

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